What is claimed is:

1) **An abrasive carbon foam produced by the controlled foaming of a blend comprising:**

   A) **from about 90 to about 99% by volume of a particulate coal exhibiting a free swell index of between about 3.5 and about 5.0 and of a small diameter; and**

   B) **from about 1 to about 10% by volume of a carbide precursor.**

2) **The abrasive carbon foam of claim 1 wherein said particulate coal exhibits a free swell index of between about 3.75 and about 4.5.**

3) **The abrasive carbon foam of claim 1 wherein said carbide precursor comprises a member selected from the group consisting of materials capable of reacting with carbon to form carbides under carbon calcining and graphitizing conditions.**

4) **The abrasive carbon foam of claim 3 wherein said carbide precursor is selected from the croup consisting of: tungsten, silicon and titanium.**

5) **The abrasive carbon foam of claim 3 wherein said carbon precursor powder is of a particle size below about 100 microns.**

6) The abrasive carbon foam of claim 3 which is a semi-crystalline, largely isotropic, porous coal-based product having a density of between about 0.2 and about 0.5 g/cm^3.

7) The abrasive carbon foam of claim 3 which is a semi-crystalline, largely isotropic, porous coal-based product having a density of between about 0.3 and about 0.4 g/cm^3.

8) A method for producing an abrasive carbon foam comprising:

A) comminuting coal exhibiting a free swell index of between about 3.5 and about 5.0 to a small particle size to form a particulate coal;

B) blending said particulate coal with from about 1 to about 10% by volume of a carbide precursor to form a reactive blend;

C) heating said reactive blend in a mold under a non-oxidizing atmosphere to a temperature of between about 300° C and about 600° C and soaking at this temperature for a period of from about 10 minutes to about 12 hours to form a green foam blend;

D) carbonizing said green foam blend to form a carbonized foam by heating to a temperature of between about 600°C and about 1600°C in an inert atmosphere and

holding at said temperature for a period of from about 1 to about 3 hours to form a carbonized foam; and

E) graphitizing said carbonized foam by heating said carbonized foam to a temperature of between about 1700°C and about 3000°C in an inert atmosphere and holding at said temperature for a period of less than about one hour to form said abrasive carbon foam.

9) The method of claim 8 wherein said carbide precursor comprises a member selected from the group consisting of materials capable of reacting with carbon to form carbides under carbon calcining and graphitizing conditions.

10) The method of claim 9 wherein said carbide precursor is selected from the croup consisting of: tungsten, silicon and titanium.

11) The method of claim 9 wherein said carbon precursor powder is of a particle size below about 100 microns.

12) The method of claim 8 wherein said particulate coal exhibits a free swell index of between about 3.75 and about 4.5.

13) An abrasive carbon foam manufactured by a process comprising:

A) comminuting coal exhibiting a free swell index of between about 3.5 and about 5.0 to a small particle size to form a particulate coal;

B) blending said particulate coal with from about 1 to about 10% by volume of a carbide precursor to form a reactive blend;

C) heating said reactive blend in a mold under a non-oxidizing atmosphere to a temperature of between about 300° C and about 600° C and soaking at this temperature for a period of from about 10 minutes to about 12 hours to form a green foam blend;

D) carbonizing said green foam blend to form a carbonized foam by heating to a temperature of between about 600°C and about 1600°C in an inert atmosphere and holding at said temperature for a period of from about 1 to about 3 hours to form a carbonized foam; and

E) graphitizing said carbonized foam by heating said carbonized foam to a temperature of between about 1700°C and about 3000°C in an inert atmosphere and holding at said temperature for a period of less than about one hour to form said abrasive carbon foam.

14) The abrasive carbon foam of claim 13 wherein said particulate coal exhibits a free swell index of between about 3.75 and about 4.5.

15) The abrasive carbon foam of claim 13 wherein said carbide precursor comprises a member selected from the group consisting of materials capable of reacting with carbon to form carbides under carbon calcining and graphitizing conditions.

16) The abrasive carbon foam of claim 14 wherein said carbide precursor is selected from the croup consisting of: tungsten, silicon and titanium.

17) The abrasive carbon foam of claim 13 wherein said carbide precursor powder is of a particle size below about 100 microns.

18) The abrasive carbon foam of claim 13 which is a semi-crystalline, largely isotropic, porous coal-based product having a density of between about 0.2 and about 0.5g/cm^3.

19) The abrasive carbon foam of claim 13 which is a semi-crystalline, largely isotropic, porous coal-based product having a density of between about 0.3 and about 0.4g/cm^3.

20) The abrasive carbon foam of claim 1 wherein said coal particulate is a high volatile bituminous coal containing between about 35% and 45% by weight of volatile matter.

21) The abrasive carbon foam of claim 20 wherein said high volatile bituminous coal has a Gieseler initial softening temperature above about 380° C.

22) The semi-crystalline, largely isotropic, carbon foam of claim 21 wherein said high volatile bituminous coal has a Gieseler initial softening temperature between about 380° C and about 400° C.

23) The semi-crystalline, largely isotropic, carbon foam of claim 20 wherein said high volatile bituminous coal has a plastic range of at least about 50° C.

24) The abrasive carbon foam of claim 20 wherein said high volatile bituminous coal has a plastic range of from about 75° C to about 100° C.

25) The abrasive carbon foam of claim 20 wherein said high volatile bituminous coal has a maximum fluidity of at least several hundred ddpm as determined by ASTM D2639.

26) The abrasive carbon foam of claim 25 wherein said high volatile bituminous coal has a maximum fluidity of more than 2000 ddpm as determined by ASTM D2639.

27) The abrasive carbon foam of claim 20 wherein said high volatile bituminous coal exhibits an expansion of at least about 20% as determined by Arnu dilatation.

28) The abrasive carbon foam of claim 27 wherein said high volatile bituminous coal exhibits an expansion of at least about 100% as determined by Arnu dilatation.

29) The abrasive carbon foam of claim 20 wherein said high volatile bituminous coal: 1)comprises; A) from about 50 to about 60% by weight of fixed carbon; and B) less than about 30% by weight inert maceral material; 2) exhibits a vitrinite reflectance in the range of from about 0.80 and about 0.95 as determined by ASTM D2798 and 3) exhibits 0.0 volume % moderate or severe oxidation as determined by ASTM D2798.

30) The abrasive carbon foam of claim 1 having a density of between about 0.2 g/cm^3 and about 0.5g/cm^3.

31) The abrasive carbon foam of claim 1 having a density of between about 0.3 g/cm^3 and about 0.4g/cm^3.

32) The method of claim 8 wherein said carbide precursor comprises a member selected from the group consisting of materials capable of reacting with carbon to form carbides under carbon calcining and graphitizing conditions.

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33) The method of claim 32 wherein said carbide precursor is selected from the croup consisting of: tungsten, silicon and titanium. uranium JP 60161369A SU 973509

34) The method of claim 32 wherein said carbon precursor powder is of a particle size below about 100 microns.

35) The method of claim 31 wherein said particulate coal exhibits a free swell index of between about 3.75 and about 4.5.